



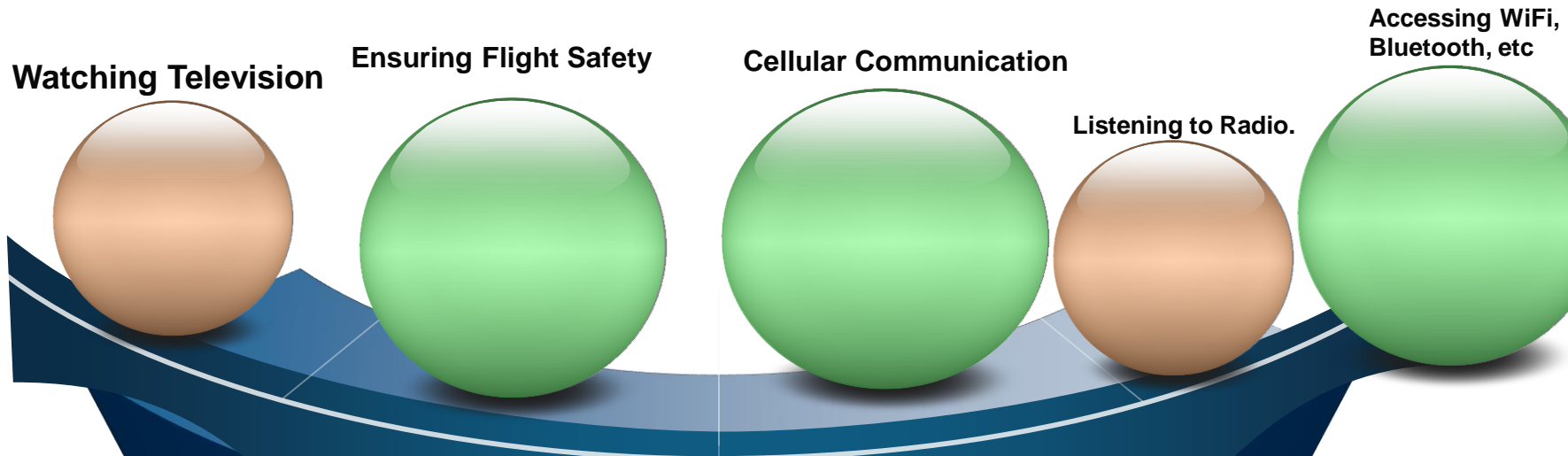
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The Spectral Opportunity of TV White Spaces for Dynamic Spectrum Access Implementation

Background – Radio Frequency Spectrum



The RF Spectrum (3KHz to 300GHz)

Radio Frequency Spectrum: Ranges

Designation	Abbreviation	Frequencies	Wavelengths
Very Low Frequency	VLF	3 kHz - 30 kHz	100 km - 10 km
Low Frequency	LF	30 kHz - 300 kHz	10 km - 1 km
Medium Frequency	MF	300 kHz - 3 MHz	1 km - 100 m
High Frequency	HF	3 MHz - 30 MHz	100 m - 10 m
Very High Frequency	VHF	30 MHz - 300 MHz	10 m - 1 m
Ultra High Frequency	UHF	300 MHz - 3 GHz	1 m - 100 mm
Super High Frequency	SHF	3 GHz - 30 GHz	100 mm - 10 mm
Extremely High Frequency	EHF	30 GHz - 300 GHz	10 mm - 1 mm

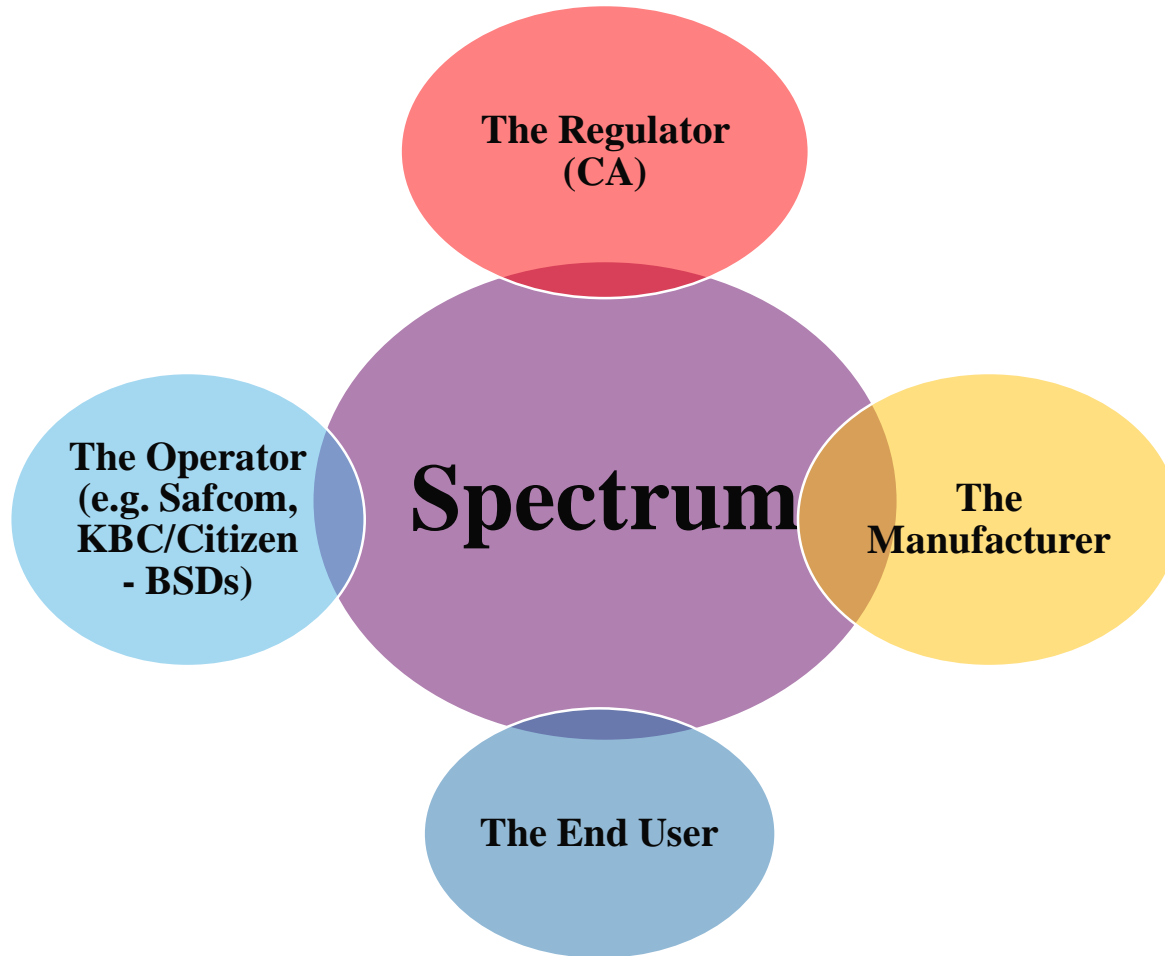


Spectrum Usage

- ❖ The main uses of spectrum in Kenya include:
 1. Television and FM radio broadcasting
 2. Satellite Communications
 3. Cellular mobile telecommunications and Internet of Things
 4. Maritime radio services
 5. Emergency and disaster communication services (VHF/UHF communications for police and firemen, HF communications for relief agencies)
 6. Space based communication such as Weather forecasting
 7. Air traffic control
 8. National Defence and public safety
 9. Global Positioning Systems (GPS) and remote controls
 10. Keyboards, wireless computing mice and headphones



Spectrum Players



Spectrum Players Cont'd

- ❖ **The Regulator** – Determines the access conditions to radio resources and just procedures for use.
- ❖ **The Operator** – Defines and operates the services making total or partial use of frequencies.
- ❖ **The Manufacturer**, who depending on regulations drafted by the regulator bills and ensures the dissemination of the equipment required for the supply of the services which the operator wishes to offer or which the end user desires.
- ❖ **The End User**



TV White Spaces

TV white space (TVWS) refers to frequencies made available by the switchover to digital terrestrial television

TV broadcasters operate in these frequencies but do not use all of them everywhere

Some of these frequencies could safely be used by other users without interfering with incumbent services

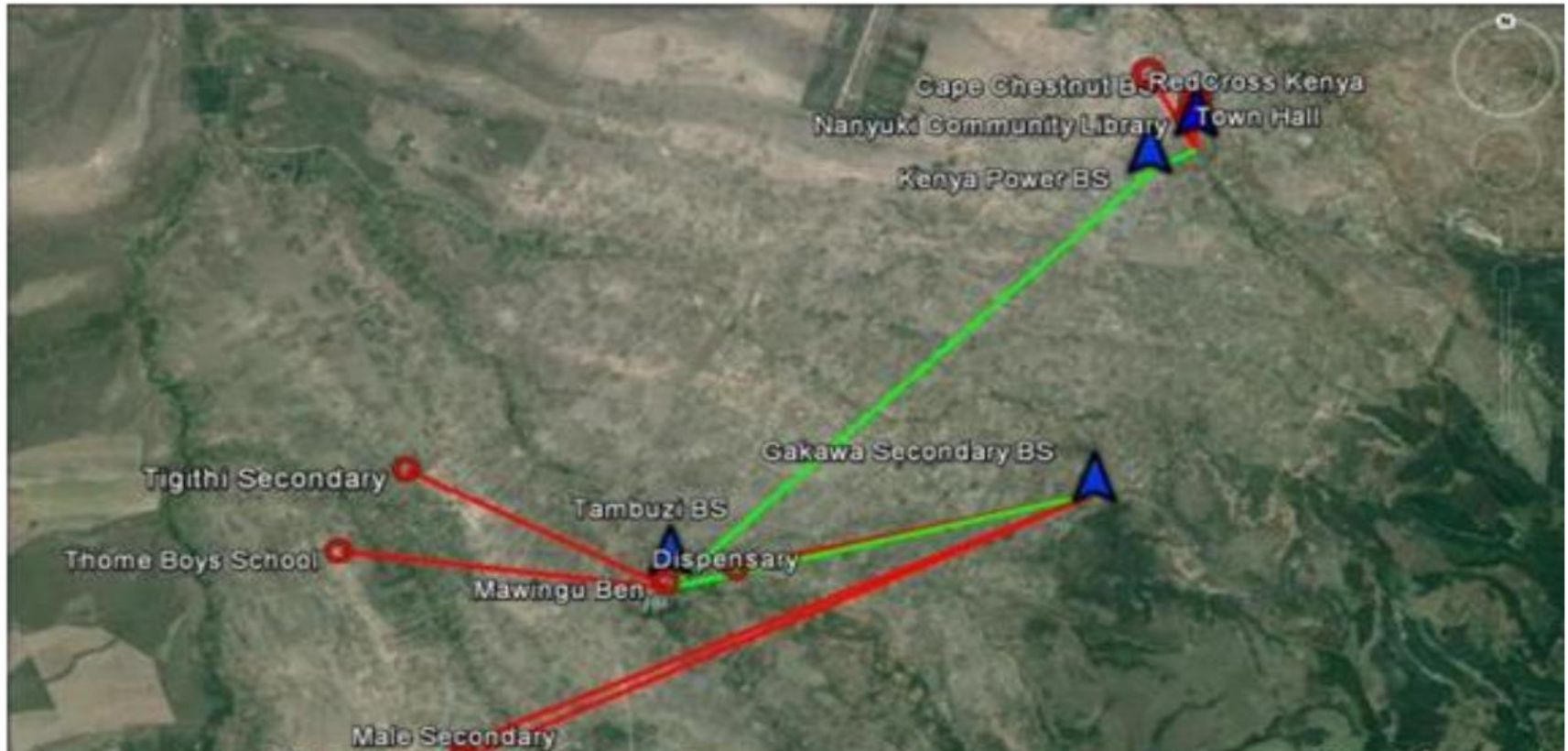
Several countries have already regulated TVWS (e.g. US, UK, Canada, Singapore), others are close (e.g. South Africa, Colombia), and there are trials all over the world

In Kenya the band available for TV transmissions that could opportunistically be used for TVWS is 470-694 MHz. In Europe, 470-790 MHz while in the USA, 470-698 MHz.

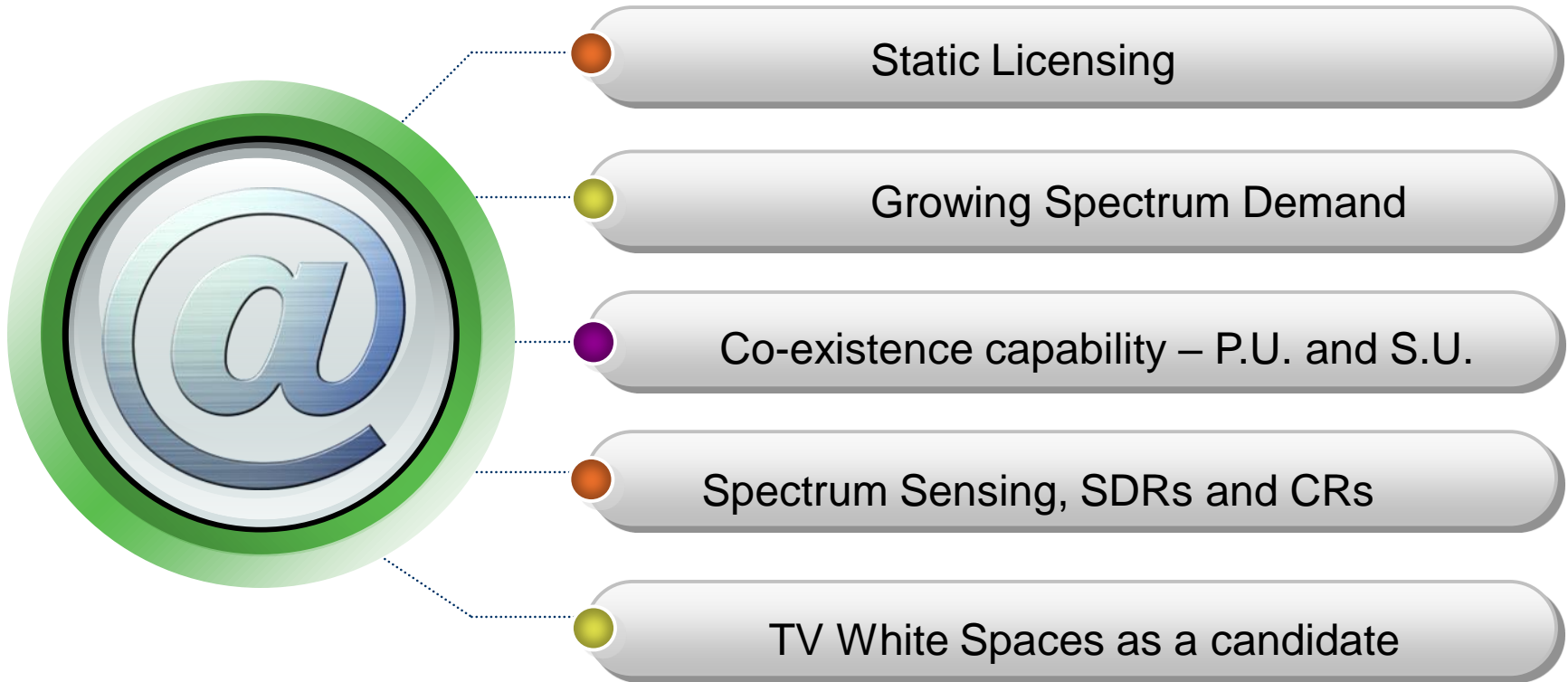


The Mawingu Project

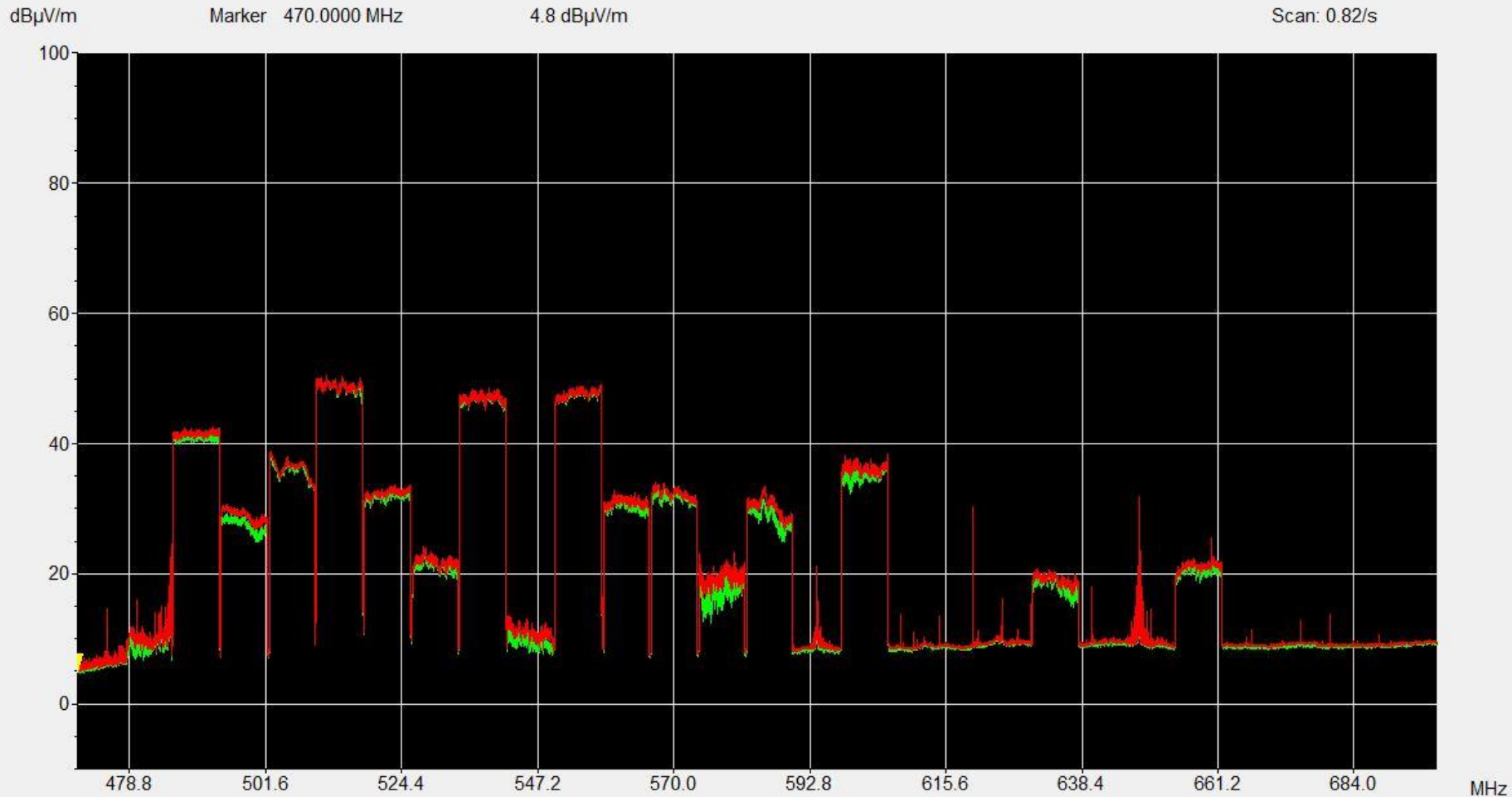
Mawingu Network in Nanyuki, Kenya



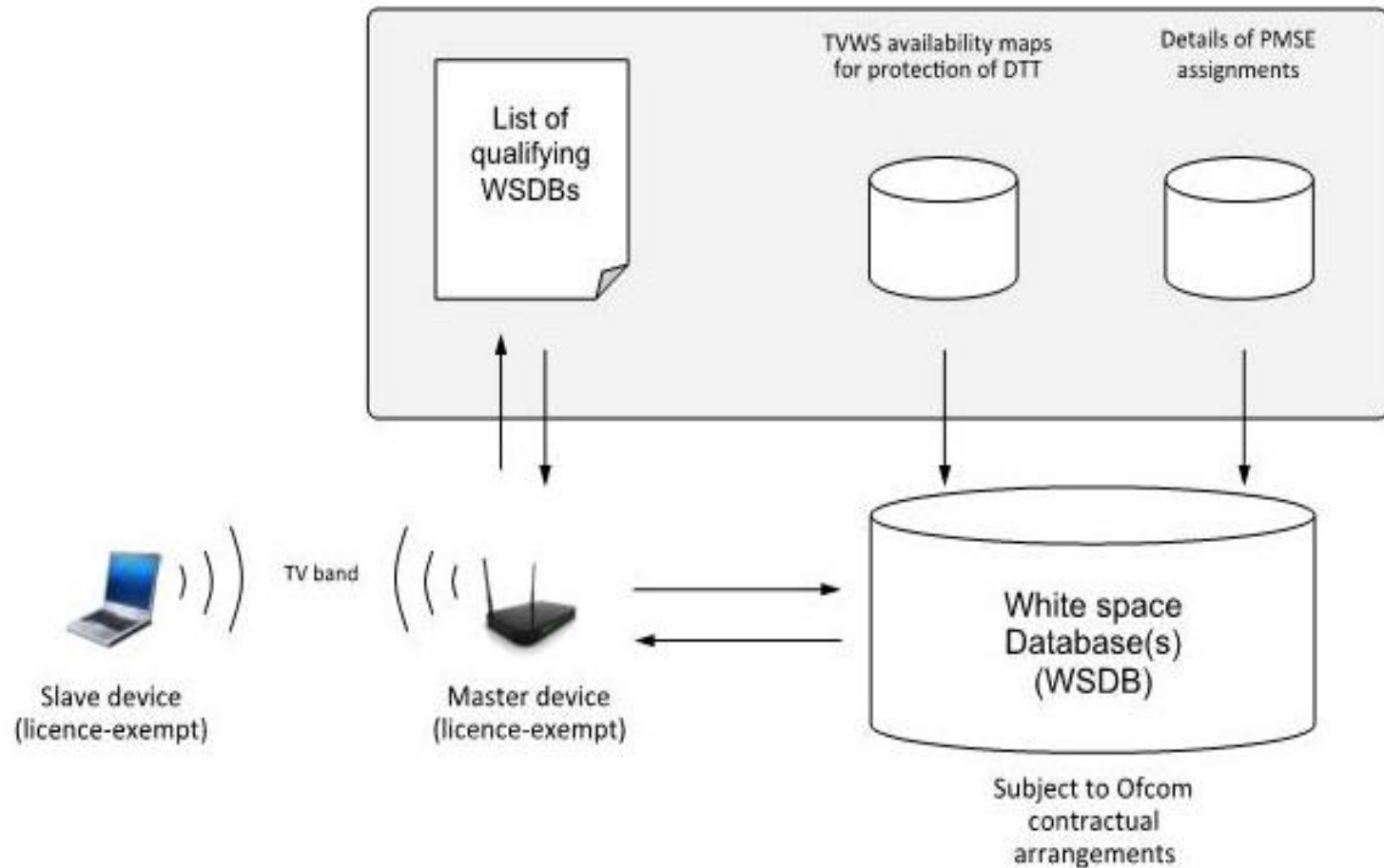
Dynamic Spectrum Sharing



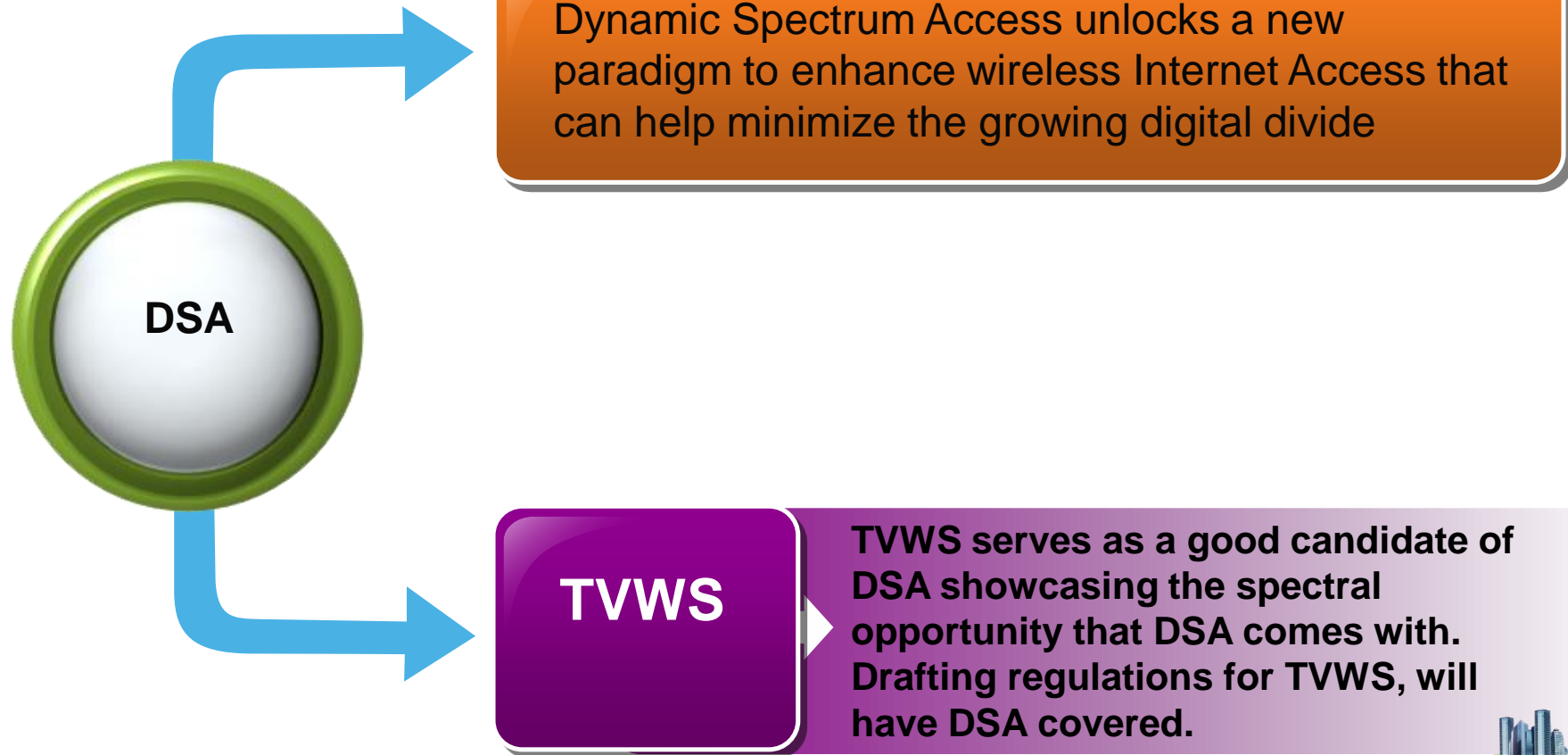
The Existing Spectral Opportunity



Regulatory Frameworks – DSA Rules



Conclusions





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Thank You !

Q&A

